CLAIMS

What is claimed is:

1. A method for modifying a general purpose ultrasound system, the general purpose ultrasound system being conventionally equipped with first and second ports each configured to couple to a hand-held probe, the method comprising:

coupling a hand-held probe to said first port;

coupling a mechanically-driven breast scanning probe to said second port, said mechanically-driven breast scanning probe being a component of a full-field breast ultrasound (FFBU) scanning apparatus including probe driving hardware and associated probe driving circuitry;

establishing a data communication path between said probe driving circuitry and said general purpose ultrasound system; and

programming said general purpose ultrasound system to accommodate both (i) a first operating mode in which said hand-held probe is operated in a conventional manner and signals therefrom are processed according to a conventional hand-held operation of the general purpose ultrasound system, and (ii) a second operating mode in which said breast scanning probe is mechanically driven under control of the general purpose ultrasound system while signals therefrom are processed by the general purpose ultrasound system to generate FFBU breast image data.

2. The method of claim 1, further comprising providing a user-controllable switch for causing said general purpose ultrasound system to switch between said first and second operating modes.

3. The method of claim 1, said general purpose ultrasound system having a single ultrasound engine configured to accommodate hand-held ultrasound probes having a predetermined number of transducer elements, said mechanically-driven breast scanning probe being equipped with more transducer elements than said predetermined number, said method further comprising providing sliding-window logic between said mechanically-driven breast scanning probe and said ultrasound engine such that the presence of additional transducer elements is substantially transparent to the operation of said ultrasound engine.

4. The method of claim 3, wherein said sliding-window logic comprises a field-programmable gate array.

5. The method of claim 3, further comprising programming said general purpose ultrasound system to process an output of said ultrasound engine in a manner that compensates for said sliding window logic when generating said FFBU breast image data.

6. The method of claim 3, said general purpose ultrasound system being conventionally equipped with conventional user interface driving software in communication with a user interface, the method further comprising installing a first software switch between said conventional user interface driving software and said user interface, said first software switch maintaining said communication in said first operating mode, said first software switch terminating said communication in said second operating mode and instead maintaining communication between said user interface and an FFBU user interface driving module in said second operating mode, such that said user interface operates according to an FFBU display mode when said general purpose ultrasound system is in said second operating mode.

7. The method of claim 6, said general purpose ultrasound system being conventionally equipped with conventional system/data control software in communication with said ultrasound engine, the method further comprising installing a second software switch between said conventional system/data control software and said ultrasound engine, said second software switch maintaining said communication in said first operating mode, said second software switch terminating said communication in said second operating mode and instead maintaining communication between said ultrasound engine and an FFBU system/data control module when said general purpose ultrasound system is in said second operating mode.

8. A dual-purpose ultrasound system, comprising:

a general purpose ultrasound system, the general purpose ultrasound system being conventionally equipped with first and second ports each configured to couple to a hand-held probe;

a hand-held probe coupled to said first port;

a full-field breast ultrasound (FFBU) scanning apparatus comprising a mechanically-driven breast scanning probe, probe driving hardware for driving said breast scanning probe, and probe driving circuitry associated with said probe driving hardware, wherein said breast scanning probe is coupled to said second port of said general purpose ultrasound system; and

a data communication path between said probe driving circuitry and said general purpose ultrasound system;

wherein said general purpose ultrasound system is configured to accommodate both (i) a first operating mode in which said hand-held probe is operated in a conventional manner and signals therefrom are processed according to a conventional hand-held operation of the general purpose ultrasound system, and (ii) a second operating mode in which said breast scanning probe is mechanically driven under control of the general purpose ultrasound system while signals therefrom are processed by the general purpose ultrasound system to generate FFBU breast image data.

9. The dual-purpose ultrasound system of claim 8, further comprising a user-controllable switch for causing said system to switch between said first and second operating modes.

10. The dual-purpose ultrasound system of claim 8, said general purpose ultrasound system having a single ultrasound engine configured to accommodate hand-held ultrasound probes having a predetermined number of transducer elements, said mechanically-driven breast scanning probe being equipped with more transducer elements than said predetermined number, said dual-purpose ultrasound system further comprising sliding-window logic along a path between said mechanically-driven breast scanning probe and said ultrasound engine such that the presence of additional transducer elements is substantially transparent to the operation of said ultrasound engine.

11. The dual-purpose ultrasound system of claim 10, wherein said sliding-window logic comprises a field-programmable gate array.

12. The dual-purpose ultrasound system of claim 10, said general purpose ultrasound system being configured to process an output of said ultrasound engine in a manner that compensates for said sliding window logic when generating said FFBU breast image data.

13. The dual-purpose ultrasound system of claim 10, said general purpose ultrasound system being conventionally equipped with conventional user interface driving software in communication with a user interface, further comprising a first software switch between said conventional user interface driving software and said user interface, said first software switch maintaining said communication in said first operating mode, said first software switch terminating said communication in said second operating mode and instead maintaining communication between said user interface and an FFBU user interface driving module in said second operating mode, such that said user interface operates according to an FFBU display mode when said general purpose ultrasound system is in said second operating mode.

14. The dual-purpose ultrasound system of claim 13, said general purpose ultrasound system being conventionally equipped with conventional system/data control software in communication with said ultrasound engine, further comprising a second software switch between said conventional system/data control software and said ultrasound engine, said second software switch maintaining said communication in said first operating mode, said second software switch terminating said communication in said second operating mode and instead maintaining communication between said ultrasound engine and an FFBU system/data control module when said general purpose ultrasound system is in said second operating mode.

15. A full-field breast ultrasound (FFBU) toolkit for adapting and integrating a general purpose ultrasound system into a dual-purpose ultrasound system, the general purpose ultrasound system being conventionally equipped with first and second ports each configured to couple to a hand-held probe, the FFBU toolkit comprising:

a full-field breast ultrasound (FFBU) scanning apparatus comprising a mechanically-driven breast scanning probe, probe driving hardware for driving said breast scanning probe, and probe driving circuitry associated with said probe driving hardware, wherein said breast scanning probe is configured to couple to the second port of the general purpose ultrasound system;

means for establishing a data communication path between said probe driving circuitry and the general purpose ultrasound system; and

means for programming said general purpose ultrasound system to accommodate both (i) a first operating mode in which a hand-held probe coupled to the first port is operated in a conventional manner and signals therefrom are processed according to a conventional hand-held operation of the general purpose ultrasound system, and (ii) a second operating mode in which said breast scanning probe is coupled to said second port and is mechanically driven under control of the general purpose ultrasound system while signals therefrom are processed by the general purpose ultrasound system to generate FFBU breast image data.

16. The FFBU toolkit of claim 15, further comprising means for equipping said dual-purpose ultrasound system with a user-controllable switch for causing said dual-purpose ultrasound system to switch between said first and second operating modes.

17. The FFBU toolkit of claim 15, said general purpose ultrasound system having a single ultrasound engine configured to accommodate hand-held ultrasound probes having a predetermined number of transducer elements, said mechanically-driven breast scanning probe being equipped with more transducer elements than said predetermined number, said FFBU toolkit further comprising means for equipping said dual-purpose ultrasound system with sliding-window logic along a path between said mechanically-driven breast scanning probe and said ultrasound engine such that the presence of additional transducer elements is substantially transparent to the operation of said ultrasound engine.

18. The FFBU toolkit of claim 17, wherein said sliding-window logic comprises a field-programmable gate array.

19. The FFBU toolkit of claim 17, further comprising means for programming said dual-purpose ultrasound system to process an output of said ultrasound engine in a manner that compensates for said sliding window logic when generating said FFBU breast image data.

20. The FFBU toolkit of claim 17, said general purpose ultrasound system being conventionally equipped with conventional user interface driving software in communication with a user interface, said FFBU toolkit further comprising means for equipping said dual-purpose ultrasound system with a first software switch between said

conventional user interface driving software and said user interface, said first software switch maintaining said communication in said first operating mode, said first software switch terminating said communication in said second operating mode and instead maintaining communication between said user interface and an FFBU user interface driving module in said second operating mode, such that said user interface operates according to an FFBU display mode when said general purpose ultrasound system is in said second operating mode.